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KING COUNTY  
Wastewater Treatment Division  
Department of Natural Resources  
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Seattle, WA 98104-3855  
(206) 684-1791

DATE: September 20, 2000

TO: Distribution List

FROM: Priscilla Hackney, Project Manager  
CIP Section Engineering Group

SUBJ: September 27, 2000 Meeting Purpose and Preparatory Information

The (expanded) Duwamish/Diagonal Study Area has been characterized with PCBs as the primary chemical of concern. Preliminary remediation options and costs for the expanded area (the six areas identified in Figure ES-1) have been developed. The cost of remediating the entire expanded area exceeds funds available to the Elliott Bay Duwamish Restoration Program (EBDRP) Panel under the 1991 Consent Decree. The 1991 Consent Decree requires remediation of contaminated sediments associated with King County Department of Natural Resources (formerly Metro) and City of Seattle combined sewer overflow and storm drain outfalls.

Per the Washington State Sediment Management Standards (SMS, Chapter 173-204 Washington Administrative Code), The EBDRP Panel must move into the Alternatives Evaluation (AE) phase of the Duwamish/Diagonal Project. Not having enough money to remediate the entire expanded Duwamish/Diagonal Study Area, the Panel must decide on the boundaries of the site to be addressed in the AE. The Panel would like to make this decision while taking into account its limited resources, the parties involved, the need to reduce risks posed by PCBs and potential future activities in the area. The purpose of the September 27, 2000 meeting is to discuss defining an effective cleanup project at the Duwamish/Diagonal site with all relevant factors under consideration.

The attached packets of information summarize the *Draft Duwamish/Diagonal CSO/SD Site Assessment (SA) Report* and *Task 302--Develop Intermediate Remedial Actions for AE Scoping--Preliminary Cost Data*.

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The following items are included in the *Draft Duwamish/Diagonal CSO/SD Site Assessment (SA) Report* packet:

- The Executive Summary. The Executive Summary states the major conclusions of the SA Report.
- Table 2.1. Table 2.1 lists the history of property ownership and construction activities near the site.
- Figure 5-14. Figure 5-14 shows sampling locations along with corresponding PCB data results from the 1998 EPA Surface Sediment Study.
- Figure 5-15. Figure 5-15 shows the sampling locations along with corresponding PCB data results from both the 1998 EPA Surface Sediment Study and the King County Duwamish/Diagonal Study.
- Figure 5-2. Figure 5-2 shows sampling locations along with Mercury subsurface sediment data results from the King County Duwamish/Diagonal Study.
- Figure 5-4. Figure 5-4 shows sampling locations along with Total PCBs subsurface sediment data results from the King County Duwamish/Diagonal Study.
- Figure 5-6. Figure 5-6 shows sampling locations along with Bis(2-Ethylhexyl)Phthalate subsurface sediment data results from the King County Duwamish/Diagonal Study.
- Figure 5-8. Figure 5-8 shows sampling locations along with Benzyl Butyl Phthalate subsurface sediment data results from the King County Duwamish/Diagonal Study.
- Figure 5-10. Figure 5-10 shows a potential surface area cleanup based on Total Mercury data results from the King County Duwamish/Diagonal Study.
- Figure 5-11. Figure 5-11 shows a potential surface area cleanup based on Bis(2-Ethylhexyl)Phthalate data results from the King County Duwamish/Diagonal Study.
- Figure 5-13. Figure 5-13 shows a potential surface area cleanup based on Benzyl Butyl Phthalate data results from the King County Duwamish/Diagonal Study.

The following items are included in the *Task 302--Develop Intermediate Remedial Actions for AE Scoping--Preliminary Cost Data* packet:

- Figure ES-1. Area of Focus Expanded to Include Most Stations that Exceed SQS/CSL for PCBs--Aggregate of Areas 1, 2, 3, 4, 5, and 6.
- Figure 1. Deepest Historical Dredge Depths--Areas 1, 2, 3, 4, 5, 6.

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- Figures 2, 2a, 3, 4 and 5. Representative Dredge Layouts of Some of the Remediation Options Considered for the Various Areas. The Dredge Layout to Deepest Historical Depths figures (2a, 4, and 5) show the worse case remedial option for the area with respect to volume of sediment removed. Remedial options that include dredging to greatest historical depth have been considered to ensure that all historically deposited contamination will be removed.
- Table S-1. Summary of Construction Cost Estimate by Remedial Option. Non of the remedial options are exactly the same. However, the remedial options that are similar have been given a similar label of A, B, C or I. The main components of all A options are to dredge to deepest historical dredge depth and upland disposal. The main components of all B options are to dredge to deepest historical dredge depth and aquatic disposal. The main components of all C options are to dredge to minimum depth across site and construct cap over entire site. The main components of all I options are to dredge to -37 feet and upland disposal. Remedial options with a significant variation from the similar options have been given a distinct label of option D, E, F, G or H.
- Table S-2. Total Implementation Cost Estimate by Remedial Option.
- Table S-3. Range of Total Implementation Cost Estimate by Area.
- Tables 1 – 6. Detailed—Construction Cost Estimates, Areas 1, 2, 3, 4, 5 and 6.

The packets are attached for your use and information; please review them before the meeting scheduled as follows:

Wednesday, September 27, 2000  
1:00 – 4:00 p.m.  
King Street Center Conference Room 5C  
201 South Jackson Street  
Seattle, WA 98104

Should you have any questions regarding the attached information, please contact Priscilla Hackney by e-mail at [priscilla.hackney@metrokc.gov](mailto:priscilla.hackney@metrokc.gov) or by telephone at (206) 684-1791.

Attachments  
PIH:s  
Cover 9/27/00 Meeting:

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Peter Adolphson, Ecology ✓  
Martha Burke, City of Seattle  
Tim Clancy, NOAA  
Robert Clark, Jr., NOAA  
Margaret Duncan, Suquamish Tribe  
Priscilla Hackney, King County  
Rick Huey, Ecology  
Loren McPhillips, USEPA

Joanne Polayes, Ecology  
Pat Romberg, King County  
Glen St. Amant, Muckleshoot Tribe  
Jeff Stern, King County  
Bob Swartz, King County  
Curtis Tanner, USF&WS  
Martha Turvey, Ecology

## EXECUTIVE SUMMARY

The Elliott Bay/Duwamish Restoration Program (EBDRP) was established to implement the requirements of a 1991 Consent Decree defining the terms of a settlement for natural resource damages (NRD). The goals of the EBDRP include remediation of contaminated sediment associated with Metro (previously Municipality of Metropolitan Seattle but now King County Department of Natural Resources [KCDNR]) and City of Seattle (City) combined sewer overflows (CSOs) and storm drains (SDs).

This Site Assessment Report (SA Report) addresses contaminated sediment associated with the KCDNR Duwamish CSO outfall and the nearby City Diagonal Way SD/CSO outfall (Duwamish/Diagonal outfalls), both of which are either historic or current discharges to the Duwamish River in Seattle, Washington. A small primary treatment plant rated at about 8 MGD was first operated by the City of Seattle (1940-1961) and then Metro (1962-1969) and discharged up stream of these outfalls for about 30 years until it was closed in 1969. Site assessment activities included identification of contaminants of concern, delineation of the extent and magnitude of sediment contamination around the outfalls, as well as evaluations of CSO-reduction measures and watershed source controls within the Study Area. As part of this effort, KCDNR performed three rounds of sediment sampling and analysis between August 1994 and September 1996. Recontamination modeling, based on these data, was performed during this period by KCDNR and during mid-1999 by WEST Consultants. Information presented in this SA Report will be used to refine the final cleanup area and assist in the selection and design of sediment cleanup alternatives (i.e., alternatives evaluation).

Major conclusions of the SA Report are:

- CSO discharges from the Duwamish CSO outfall are controlled to less than one overflow event per year. None are known to have occurred since 1989. CSO discharges from the Diagonal Way SD/CSO outfall historically exceeded 300 million gallons per year (MGY) and continue to average over twenty events per year with a total annual CSO discharge volume estimated to be about 65 MGY.
- Stormwater currently discharges through the Diagonal Way SD/CSO outfall from both the Diagonal and Hanford Drainage Basins, with a combined drainage area of 1,583 acres. This outfall contributes a significant quantity of water to the Duwamish River during storm events, with an estimated discharge volume of 1,230 MGY.
- Watershed source control efforts being implemented or planned in the Diagonal/Hanford Drainage Basin by City Drainage and Wastewater Utility staff include storm drain sediment removal, business inspections, public education, response to citizen complaints, and tracking the source of a recurrent oil sheen.

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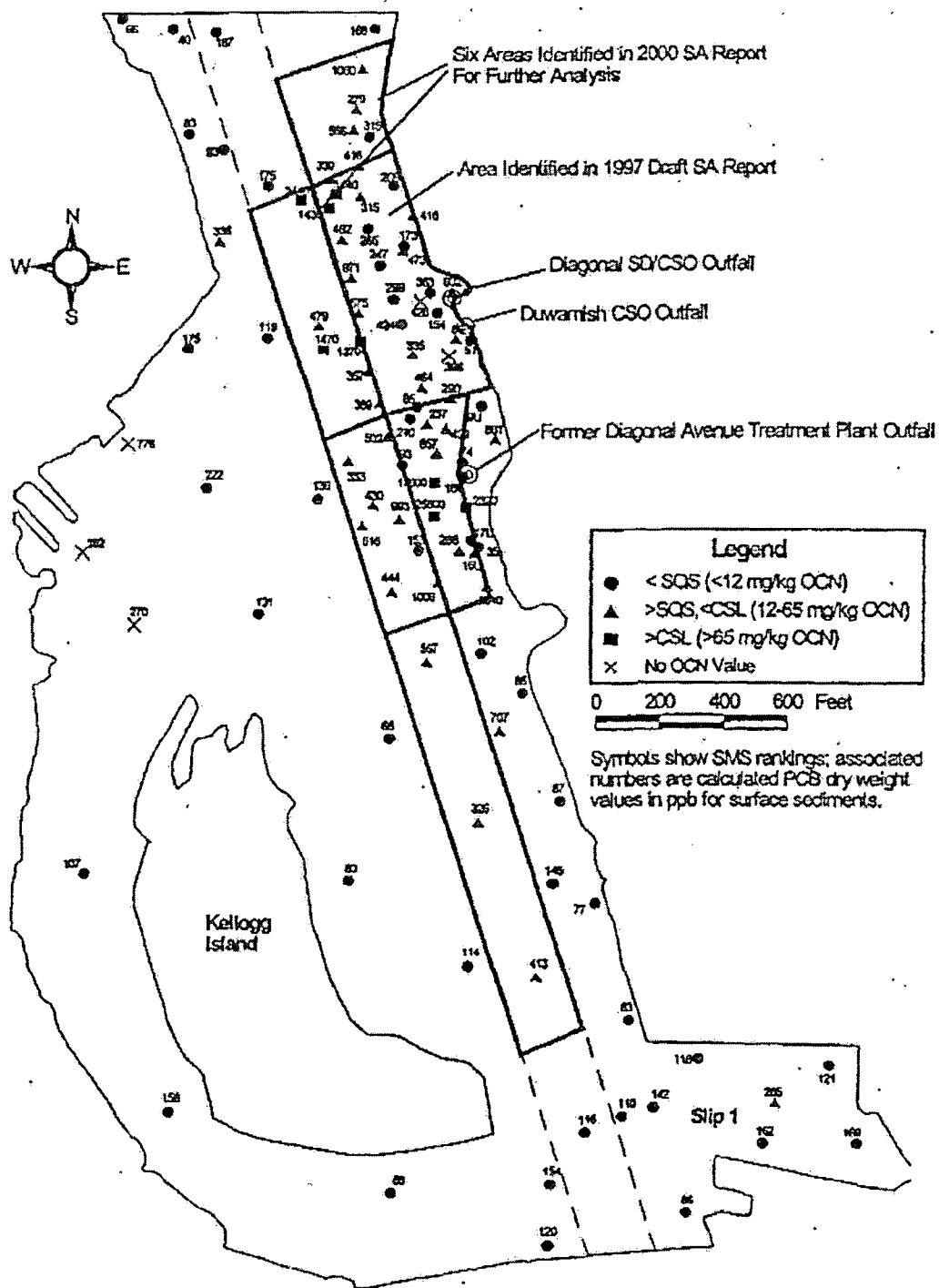
- The major chemicals of concern found in sediment in the study area near the Duwamish/Diagonal outfalls are PCBs, mercury, bis(2-ethylhexyl)phthalate and butyl benzyl phthalate. A phthalates "hot spot" is present directly in front of the Diagonal SD/CSO outfall, but there is a band of elevated phthalate surface concentrations that extend upstream and down stream. Bioassay testing at stations 350 to 500 feet from the outfall showed no toxicity to three bioassay tests even though these stations had elevated levels of phthalates.
- Stations that exceeded state sediment standards were grouped into the following three general area: the North Inshore Area, located in the vicinity of the Duwamish/Diagonal outfalls; the South Inshore Area, located near the former Diagonal Avenue Treatment Plant outfall; and the Channel Area located offshore in the dredged river channel. During much of the initial SA process, the primary area of focus for anticipated sediment remediation was the North Inshore area. New information, obtained late in the study, eventually lead to an expanded area of evaluation for potential remediation.
- During the early part of the SA process (when the 1997 draft SA Report was prepared) the potential remediation boundaries for the North Inshore Area were determined by combining the Sediment Quality Standards (SQS) and Cleanup Screening Level (CSL) chemical exceedance contours for PCBs, mercury, bis(2-ethylhexyl)phthalate and butyl benzyl phthalate together with biological testing results that established the upstream and downstream boundaries. Based on this process, the mapped SQS/CSL exceedance boundaries within the North Inshore Area are curved and would not be amenable to remediation activities that typically require more straight-line boundaries. Therefore, a rectangular cleanup boundary was established for the site based on the following conditions: 1) setting the western cleanup boundary to the physical limits imposed by the navigation channel; 2) setting the northern cleanup boundary to stations exhibiting no exceedances of sediment bioassay criteria; 3) setting the southern cleanup boundary to stations exhibiting no exceedances or limited exceedances (less than CSL) of sediment bioassay criteria; and 4) setting the eastern cleanup boundary to the shoreline. The encompassed area is estimated at 5.5 acres (approximately 26,800 square yards).
- Depth of sediment contamination is quite variable, which may reflect the effects of historical dredging and siphon construction in the riverbed within the Study Area. Sediment core data indicate that concentrations exceeding sediment criteria extend to depths of 3 to 9 feet, depending on the particular chemical and core location. In addition, some chemicals (e.g., PCBs) show increasing concentrations with depth near the outfalls.
- In 1997, it was discovered that the volume of storm flow used for initial recontamination modeling was only about one half (685 MGY) the true volume of 1230 MGY. Subsequent modeling by KCDNR in mid-1997, based on revised discharge rates for stormwater and CSO from the Diagonal

SD/CSO, indicated that recontamination by bis(2-ethylhexyl)phthalate could occur.

- In 1999, a second modeling approach was undertaken by WEST Consultants to further evaluate the potential recontamination by phthalates. A mass balance approach was used to predict the amount of source reduction that would be needed for bis(2-ethylhexyl)phthalate and butyl benzyl phthalate to result in sediment concentrations that are below the SQS values for each compound. The results suggest that even with nearly total source control of the discharge there would potentially be SQS exceedances produced solely by the background concentrations of phthalates in suspended particulate matter in the Study Area.
- In 1998, before the 1997 Draft SA Report was finalized, EPA performed a comprehensive Site Investigation Study of sediment conditions in the lower Duwamish River. The 300 surface sediment stations sampled increased the overall understanding of the spatial distribution of contaminated sediment in the river. Without the EPA data, the 1997 Draft SA Report showed that surface sediment concentrations of PCBs were higher offshore than inshore. This pattern appeared to be part of a wide spread distribution of elevated PCBs in the navigation channel. However, when both data sets are combined (1998 EPA data and 1997 Draft SA Report data), it is possible to identify a more localized area of PCBs in this part of the river. When a boundary was drawn to encompass most stations exceeding SQS/CSL values for PCBs, an area of 22 acres was enclosed. This area was divided into 6 smaller units by including the boundaries of the original area identified in the 1997 Draft SA Report and extending boundary lines across the navigation channel (See Figure ES-1). Even though all 6 areas are being considered initially for planning purposes, this does not mean that all 6 areas will be proposed for sediment remediation.
- Identification of a localized area of PCBs in the general Duwamish Diagonal Study Area justified switching to the use of PCBs as the primary chemical of concern rather than phthalates. PCBs are a major chemical of concern for the Duwamish River sediment because these chlorinated compounds bioaccumulate in organisms and represent both human health and ecological risks. Potential sponsors for sediment remediation projects are aware that the removal of PCB "hot spots" in sediment is a priority for regulatory agencies and the Tribes and has already been the focus of some cleanup actions, such as, projects at the Norfolk CSO and Boeing Plant 2. For both the Norfolk project and the Duwamish/Diagonal project, the EBD RP Panel has expressed a concern that PCBs pose a greater risk to human health and the environment than do phthalates.
- Current discharge pipes are not a significant source of PCBs. Historical activities that could have introduced PCBs or disturbed contaminated

sediments include the following: 1) a sewage and industrial drainage slough that existed prior to construction of the Diagonal SD/CSO discharge line, 2) the 1966-67 Duwamish Siphon construction project that crossed beneath the Duwamish River through PCB contaminated sediments, 3) an overloaded primary treatment plant discharging about 8 MGD until 1969, 4) a documented PCB transformer spill and cleanup in Slip 1 in 1974 and 1976, 5) extensive near shore dredging of contaminated sediments in 1977, and 6) removal of a contaminated shoal from the navigation channel in 1984.

- The greatest threat of PCB recontamination in the Study Area is from potential bucket dredging activities that disturb and mobilize contaminated sediments. One EBD RP sediment remediation project has already been recontaminated due to the disturbance of contaminated bottom sediments when a clamshell dredge bucket was used at a near-by dock renovation project. Efforts should be made to minimize recontamination potential by coordinating when and how dredging projects are carried out in this section of the river. There is the potential for phthalates in storm water to recontaminate part of the Study Area, but the highest concentrations would be located near the Diagonal SD/CSO outfall.
- The size of the remediation project has not yet been decided. The size of the proposed remediation project at Duwamish/Diagonal will be determined later by the EBD RP Panel during a preliminary decision step in the Alternatives Evaluation (AE) process. Initially, the consultant will develop preliminary remediation options and costs for all 6 areas identified in Figures ES-1. The EBD RP Panel will use this information to decide how many of the 6 areas they want the consultant to carry through the formal AE process. During the formal AE process, the consultant will refine the cost estimates, evaluate potential cleanup options according to Ecology sediment management standards (SMS) regulations, and recommend a preferred option for the site. After the Panel reviews the AE report results, the Panel will propose to Ecology a specific Cleanup Plan for the site. Ecology must decide if they concur with the proposed project and will give their decision in a Cleanup Action Decision Document. A number of other permits are required before the cleanup project can proceed.



<p>Duwamish Diagonal Sediment Cleanup Study</p> <p>Area of Focus Expanded to Include Most Stations that Exceed SQS/CSL for PCBs</p>	<p>Figure ES-1</p>
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